

UNIVERSITY OF CALIFORNIA
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION

CIRCULAR No. 239

MAY, 1922

HARVESTING AND HANDLING APRICOTS AND PLUMS FOR EASTERN SHIPMENT

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In order to secure the greatest returns from growing good fruit, it must be properly picked and handled, as well as honestly and attractively packed.

In the interest of better methods of preparing apricots and plums for market as fresh products, the Division of Pomology of the College of Agriculture has collected information and data from successful growers of these fruits and this information is herewith presented.*

HARVESTING

WHEN TO PICK

Apricots.—The color and size of the fruit indicate the proper time to pick. The “undercolor” should just be turning yellow or “straw” color when the fruit is harvested. Many growers make the mistake of picking apricots too green in order to secure the high prices paid for early fruit. Apricots fail to attain good quality if picked prematurely.

The following table† indicates the approximate relative times of ripening of the principal varieties in the Sacramento Valley:

Variety	Time of Ripening
Newcastle Early	June 1 — June 10
Royal	June 1 — June 20
Blenheim	June 12 — June 30
Tilton	June 15 — June 30
Peach	June 20 — June 30
Moorpark	June 25 — July 10

* The writer is indebted to the following individuals and organizations for information contained in this circular: Mr. and Mrs. A. G. Tucker, F. B. McKevitt, Jr., C. Neil, and A. C. Wright of Vacaville; W. S. Killingsworth and F. W. Read of Sacramento; D. Howcroft of Newcastle; and the Earl Fruit Company, the F. H. Buck Fruit Company, and the Silva-Bergtholdt Company.

† Courtesy of the California Fruit Exchange.

Plums.—The proper time of picking plums varies with the variety and depends upon its firmness of flesh, thickness of skin, and other factors which determine the “keeping quality.” Firm rather dry varieties may be left on the trees longer than the more tender-skinned, juicy sorts. In general, plums for long distance shipping are picked in a hard-ripe condition, when they are of proper size for the variety.

The following table† indicates the approximate relative times of ripening of the principal shipping varieties in the Sacramento Valley:

Variety	Time of Ripening
Beauty	June 1 — June 10
Clyman	June 3 — June 17
Botan (Abundance)	June 6 — June 29
Tragedy	June 10 — July 1
Formosa	June 10 — June 25
Red June	June 12 — July 1
Climax	June 15 — July 3
California Blue (Vacaville)	June 20 — July 3
Santa Rosa	June 25 — July 15
Burbank	June 28 — July 15
California Red	July 5 — Aug. 20
Purple Duane	July 5 — Aug. 25
Wickson	July 10 — July 25
Bradshaw	July 10 — July 25
Simonii	July 10 — July 25
Green Gage	July 10 — July 20
Diamond	July 15 — Aug. 5
Gaviota	July 20 — Aug. 5
Kelsey	July 20 — Aug. 10
Sugar	July 20 — Aug. 10
Satsuma	July 25 — Aug. 5
Washington	July 25 — Aug. 5
Jefferson	Aug. 1 — Aug. 15
Fellenberg (Italian)	Aug. 1 — Aug. 15
Yellow Egg	Aug. 1 — Aug. 10
Giant	Aug. 1 — Aug. 15
Grand Duke	Aug. 1 — Aug. 20
Gros (Hungarian)	Aug. 5 — Aug. 20
American Blue (German)	Aug. 15 — Sept. 1
President	Aug. 15 — Sept. 1

How to Pick

Apricots and plums should be picked carefully by hand with the stems attached, if possible, and gently placed in the picking receptacle, never thrown or dropped. Each fruit is separated from the spur by a slight twist or upward turn (fig. 1). It should never be jerked or

† Courtesy of the California Fruit Exchange.

pulled, for this tears and breaks the skin about the stem, which favors decay. One hand should be used to hold the branch while the fruit is picked. The bloom of such plums as Grand Duke, Diamond, Tragedy, Giant, President, and Gros should be disturbed as little as possible, for this waxy material adds to the "keeping quality" as well as to the appearance.



Fig. 1.—Picking plums. Note the method of picking, position of ladder, and picking receptacle. Lugs can be seen in the background in the shade of a tree.

There are three to five pickings, according to the rapidity with which the fruit ripens. At the first picking generally only a few of the fruits most exposed to the sun are in proper condition for harvesting.

PICKING EQUIPMENT

Picking receptacles.—There are several types of picking pails and baskets (fig. 2). Perforated tin pails or wooden stave baskets are satisfactory so long as sufficient ventilation for the fruit is provided. One advantage of the tin pail is said to be that careless pickers can be readily detected by the sound made by fruit dropped into it. The pail will last two or three seasons longer than the basket and does not scratch nor cut the fruit. Both baskets and pails are provided with hooks for hanging on the trees or the ladders (fig. 1).

Ladders.—The three-legged ladder is now used in most orchards (fig. 1). There are many styles, most of them being satisfactory, as they are well constructed, of first-class material, and light enough to be handled by the picker. The lower steps of the ladder are quickly worn by constant climbing. This may be prevented by tacking a strand of heavy wire about an inch from the edge, on top of each step most frequently used.

Lug boxes.—The orchard box or lug box into which the fruit is emptied from the picking receptacle should be well made, preferably with corner posts, wide enough to enable the basket or pail to be



Fig. 2.—(a) Picking pail, punched with holes to provide ventilation. (b) Picking basket.

lowered to the bottom for emptying, and with ends raised above the sides so that when filled and piled one above the other there will be no danger of bruising the fruit (fig. 3). The ends of the boxes should have grooves to facilitate handling when full. The 40-pound lug box is the best for soft fruits; the use of larger boxes tends to cause bruising of the fruit. Suitable dimensions for a lug box are: width inside, 12 inches; depth inside, $7\frac{1}{2}$ inches; length outside, 22 inches.

HANDLING THE PICKING CREW

A good foreman.—The selection of a capable foreman should be the first consideration of a fruit grower in picking his crop. The foreman should have considerable experience in orchard work and be intimately acquainted with the fruit business. He should know the characteristics of the different varieties, the time of ripening, and

the proper condition of the fruit for picking. He must know how to manage the pickers so that the fruit will arrive at the packing house in just the proper condition for packing. Fruit that arrives green or over-ripe indicates that the picking foreman is not paying proper attention to his work.

Work of the pickers.—The pickers are supplied with picking receptacles and ladders and divided into groups of two. Each pair is assigned by the foreman to the trees and given instructions regard-

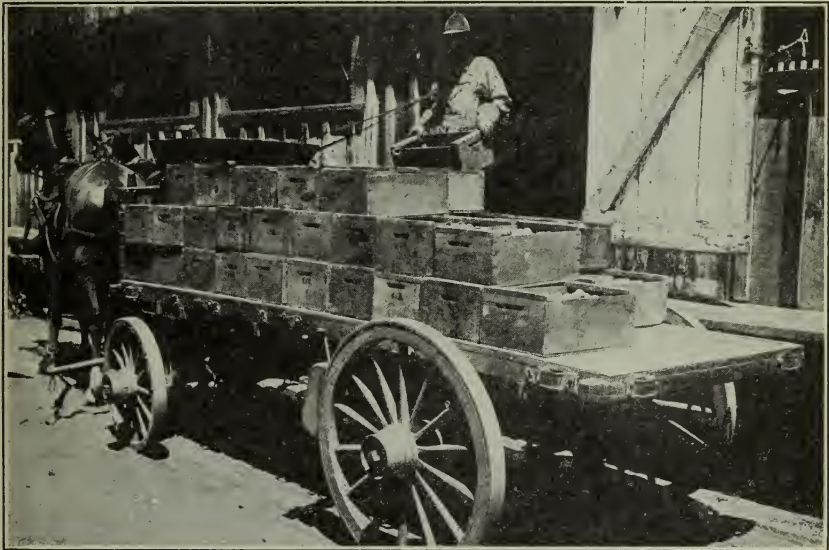


Fig. 3.—A desirable type of orchard spring wagon, with bed the same height as the platform of the packing house. Note the type of lugs and the proper method of loading them.

ing the kind of fruit desired. As the picking receptacles are filled, they are emptied into lug boxes which have been previously placed in the vicinity by the delivery man, who also collects the harvested fruit. When emptying fruit into the lug boxes, the picking receptacle should be lowered as far as possible into the box, and with one hand in front of the mouth of the receptacle, the fruit should be carefully rolled into the lug. The lug boxes should be filled only about six inches deep and kept stacked in the shade while waiting to be hauled to the packing house (fig. 1).

Pickers are generally paid by the hour instead of by the amount of fruit harvested. They should, however, average between 900 and 1500 pounds of picked fruit per day, according to the crop and its maturity.

HAULING TO THE PACKING HOUSE

It must be remembered that apricots and plums remain fit for consumption only a comparatively short time after picking, and that the ripening processes continue at a faster rate after picking than before, especially while the fruit remains warm. The filled lug boxes should be gathered promptly and transferred to the packing house without delay by an orchard spring wagon or truck, which should be "easy riding" and built low to allow convenient loading (fig. 3).



Fig. 4.—Packing table, showing bins for the fruit and packing platform holding the crate. Observe slot constructed in the table to keep the paper from being blown about.

PACKING

THE PACKING HOUSE

There are many types of structures used as packing houses, ranging from temporary sheds to permanent and well equipped buildings. The individual grower must decide for himself which kind he shall use. A well-built frame building providing good light and plenty of ventilation, makes an ideal packing house. It should be large

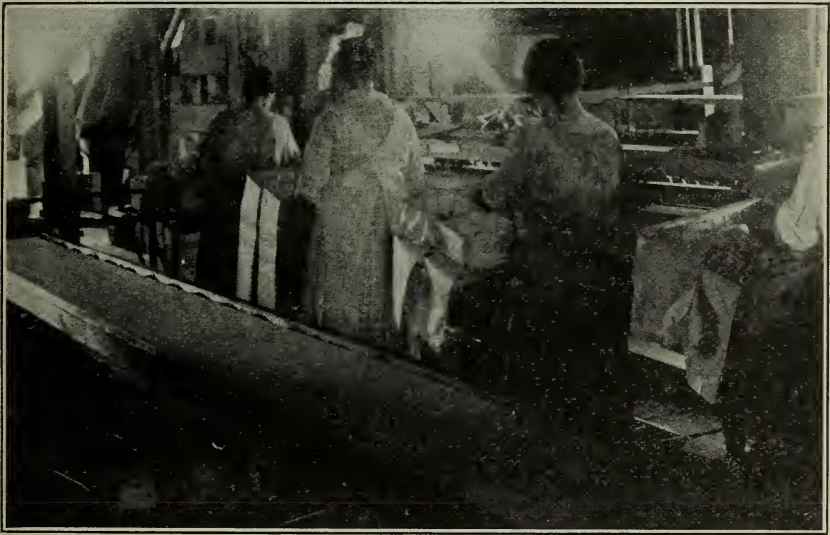


Fig. 5.—Packing plums from a mechanical sizing machine. The belt in the foreground is for transferring packed crates to the nailing press.

enough to accommodate packing tables, nailing presses, and packers, without crowding or obstructing the packing house operations. It should have a wooden floor and extending platforms to permit convenient transfer of fruit.

Arrangement.—The grower should arrange the equipment in the packing house systematically, so that the fruit may pass through the various operations of unloading, delivery to the packers, packing, inspecting, nailing, and loading with the least amount of lost motion, thus reducing the cost of packing to the minimum.

EQUIPMENT AND SUPPLIES

Packing tables.—There are many types of packing tables now in use (figs. 4-8). Any design of table is satisfactory provided bruising or cutting the fruit is prevented. For convenience in packing, the bin should be about four feet from the floor and inclined at a slight angle towards the packer. A narrow shelf constructed above the table serves to hold the empty crates and baskets. Some sort of a packing



Fig. 6.—A poorly arranged packing house. Lack of systematic arrangement reduces the rate of packing and increases the cost.

platform is provided to hold the crate, sloping towards the packer at an angle of about thirty degrees. A desirable type of table (fig. 8) is one with a shelf on the side opposite the packer, for holding the packed crates.

Inspection table.—Some means should be provided for the inspection of the packed crates. A specially constructed table is often used for this purpose (fig. 9).

Nailing press.—Every packing house with an output of approximately two hundred crates per day should be supplied with a press for holding the lids in place while being nailed (figs. 10, 11). The saving in time will quickly pay the cost of such a device.

Hand trucks.—Many packing houses are furnished with one or more hand transfer or “grab” trucks, for the purpose of transferring lug boxes and crates within the packing house and for loading and

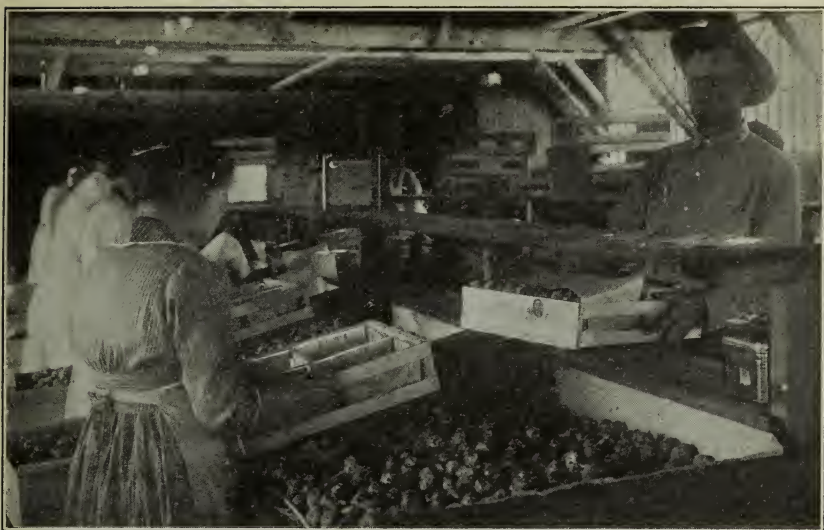


Fig. 7.—Packing table with shelf opposite the packer for holding packed crates.



Fig. 8.—Interior of packing house showing arrangement of packing tables. Plenty of light and ventilation are provided by the windows and lattice walls.

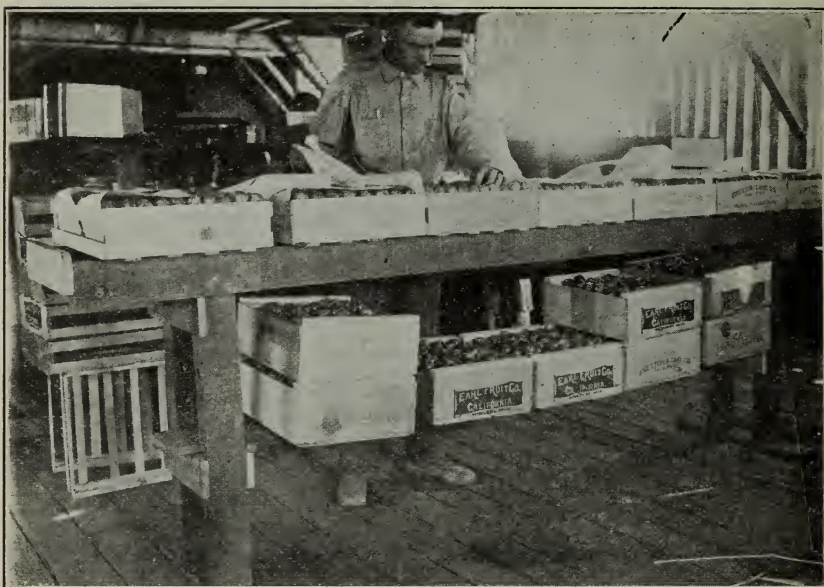


Fig. 9.—An inspection table is desirable for examination and correction of packs. Small fruit or fruit for local markets is shipped in California lugs, seen on lower shelf.

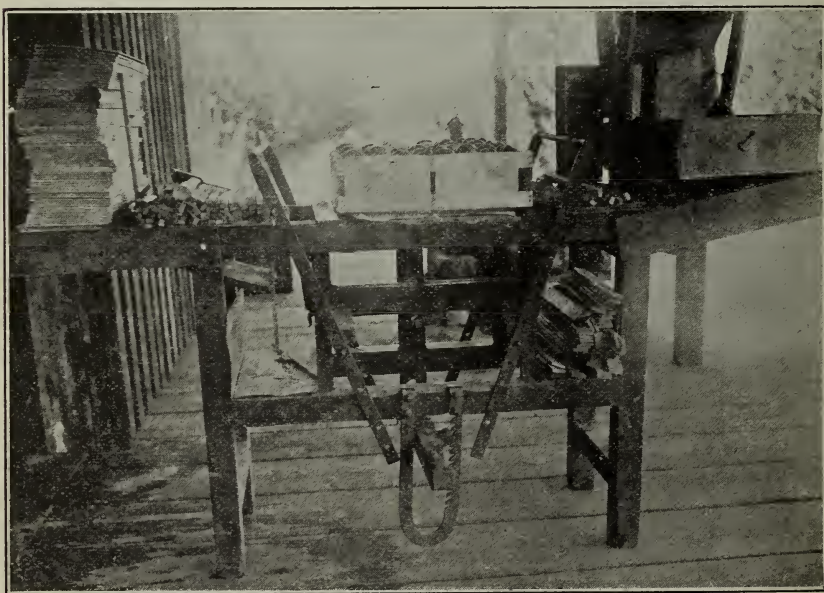


Fig. 10.—Crate in nailing press prior to application of lid and cleats.

unloading the trucks or cars. This labor-saving device is highly recommended.

Crate material.—At the present time two principal styles of standard crates are being used for plum and apricot shipping; the solid-side crate (fig. 12), in the Newcastle, Auburn, and San Joaquin Valley districts, and the eight-slat crate (fig. 14), in the Vacaville and Winters sections. The shortcomings of the eight-slat crate are its frailty, ease of breaking, and lack of support given to the sides of the baskets. The solid-side crate is a much stronger container, allows sufficient ventilation, and eliminates a great deal of breakage, and is therefore recommended for apricot and plum packing.

Specifications for the above mentioned crates are as follows:

Solid-side crate:

Ends, $\frac{5}{8}$ " \times $4\frac{1}{2}$ " \times 16", two pieces.

Sides, $\frac{3}{16}$ " \times $3\frac{3}{4}$ " \times $17\frac{1}{2}$ ", two pieces.

Bottom, $\frac{3}{16}$ " \times $5\frac{5}{8}$ " \times $17\frac{1}{2}$ ", two pieces.

Tops, $\frac{1}{8}$ " \times $7\frac{5}{8}$ " \times $17\frac{1}{2}$ ", two pieces.

Cleats, $\frac{3}{8}$ " \times $\frac{5}{8}$ " \times 16", two pieces.

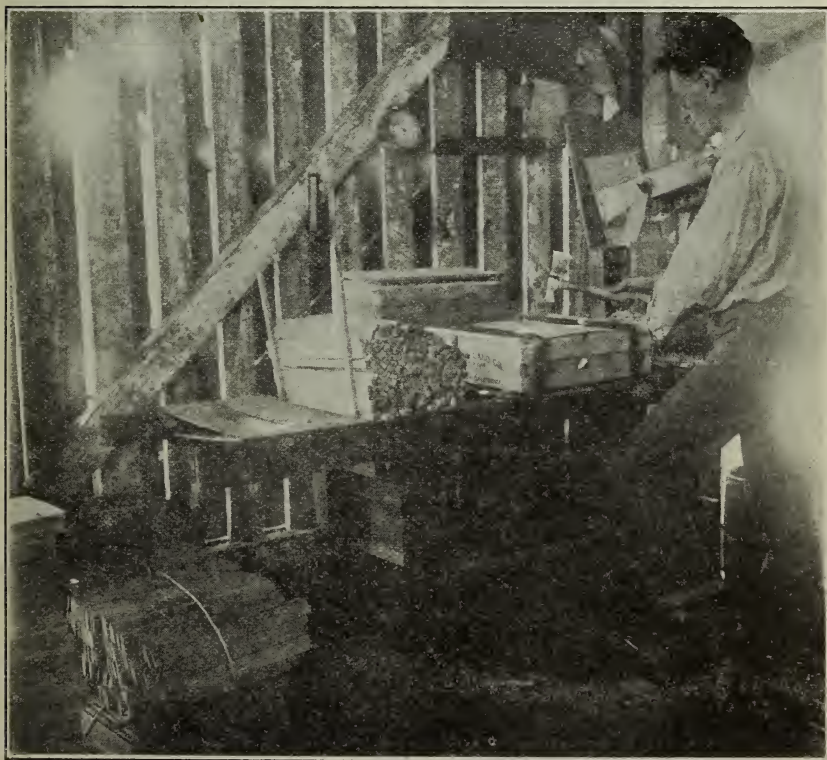


Fig. 11.—Crate in the press with lid and cleats in place ready for nailing.

Use cement-coated 4d special orange box nails for sides and bottoms, 5d for tops; total, 20 4d, 8 5d nails to the crate.

Eight-slat crate:

Ends, $1\frac{1}{16}" \times 4\frac{1}{2}" \times 16"$, two pieces.

Sides and bottom, $\frac{1}{4}" \times 1\frac{1}{2}" \times 17\frac{5}{8}"$, eight pieces.

Tops, $\frac{1}{8}" \times 8" \times 17\frac{1}{2}"$, two pieces.

Cleats, $\frac{3}{8}" \times \frac{3}{4}" \times 16"$, two pieces.

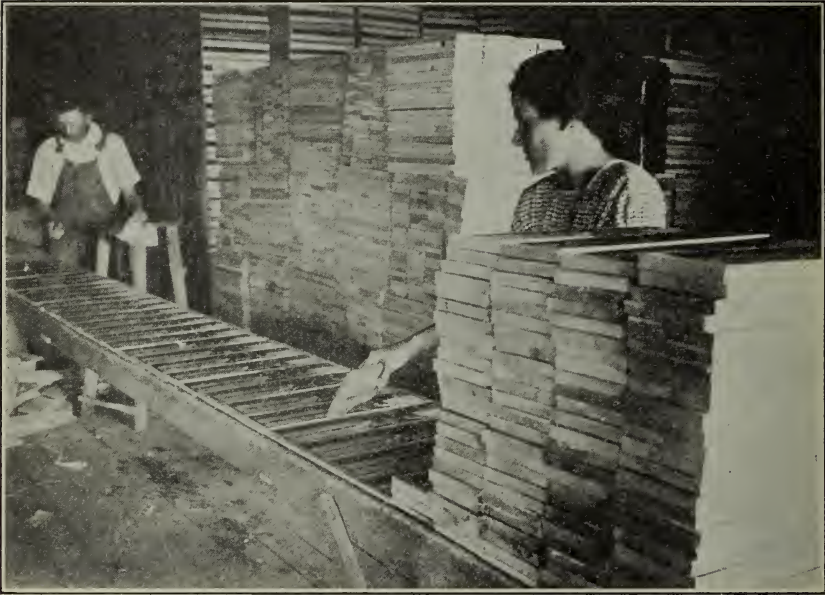


Fig. 12.—Labeling the ends. The slide is seen containing the labeled ends. A wide brush is used to smooth the labels and to wash off excess paste. Stacks of ends in the background are drying.

Use cement-coated 4d special orange box nails for sides and bottoms; 5d nails for tops; total, 32 4d, 8 5d nails to the crate.

The measurements of these crates are identical. Standard crates are made in three depths; $4\frac{1}{4}"$, $4\frac{1}{2}"$, or $4\frac{3}{4}"$ deep.

Rubber stamps.—The standardization law of California* requires that all containers of fruit shall be properly labeled with the variety and style of pack. A satisfactory way of supplying this information is by the use of rubber stamps bearing these items, e.g., "Climax," "5 \times 5."

Labels.—The law requires that all containers of fruit shall bear the name of the orchard where the fruit is produced, the post-office

*California Fresh Fruit and Vegetable Standardization Act. Copies may be obtained from the California State Department of Agriculture, Sacramento.

address thereof, the name of the person, firm, or organization that ships it, and the minimum net weight. Such facts are generally printed on a lithographed label which is pasted on the end of the crate by the shipper or sometimes stamped or stenciled on the ends when the shook is made at the factory.



Fig. 13.—Making the eight-slat crate. The “spreader” is seen holding the bottom slats equi-distant apart for nailing. The form shown is made of wood and is inferior to a form constructed of steel.

Baskets.—The standard apricot and plum basket is a sloping-sided container, measuring approximately eight inches square on top, six and one-half inches on the bottom, and four inches in depth, inside measurements. The basket is made of thin veneer, the top edges being fitted with a thin piece of tin.

Paper.—A strip of tissue paper, $7\frac{1}{2}$ inches wide and 32 inches long, is used in packing apricots and plums. This paper acts as a cushion, holds the fruit in place, prevents bruises and the spread of decay, in addition to adding attractiveness to the pack, especially when a small colored design is printed upon it.

Layer board or separator.—In some instances a thin veneer or pasteboard “shim” is placed between the layers of fruit in each basket. This “separator” is especially desirable for “broken” packs, since it allows placing the fruit on a level surface. Although just coming into use again after having been discarded for 15 or 20 years, it is believed that separators will be adopted more extensively in the future for packing apricots and plums.



Fig. 14.—The side pieces are applied to the crate while resting it upon a lower shelf.

PERSONNEL OF THE PACKING HOUSE

Foreman and assistants.—The management of the packing house should be intrusted to a man who understands every detail of packing and preparing the fruit for shipment. He must be a man who can assume responsibility and get the maximum results from the packing crew. He should be assisted by men or women of considerable experience in apricot and plum packing, their number depending upon the number of packers.

Packers.—In packing plums and apricots men, women, and girls are employed. Experience has shown that women and girls put up

better packs, though less in number, than do men, and they are usually preferred because greater returns are obtained from a few neat and attractive packs than from many hurried and inferior packs.

The common method at the present time is to pay by the hour rather than by the crate. During the season of 1921 the average price for packers was thirty cents per hour. The average daily output of a packer is in the neighborhood of forty-five crates while some packers develop a speed of ninety crates in a ten-hour day.

Crate makers.—Making up the shook may be arranged by contracting with expert crate makers who travel through the fruit sections during harvest season. Many growers, however, employ local men

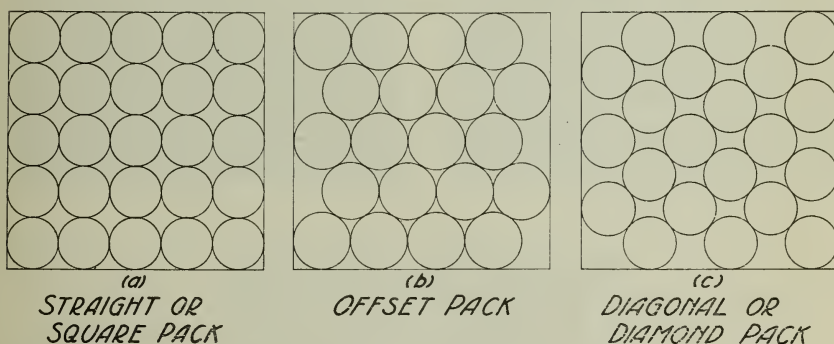


Fig. 15.—Styles of apricot and plum packs.

or boys for this work. An expert crate maker constructs as many as 1200 crates per day, but the average is about 700. The pay during the season of 1921 was one dollar a hundred crates.

Inspectors and nailers.—Usually one man acts both as inspector and nailer for the packed crates. The inspector must be capable and conscientious in his work. He must be familiar with the standardization law and the interpretations thereof, and should be careful to return all packs which are below the proper standards. He is the last man to see the fruit before it is opened on the market and the final responsibility rests upon him.

Helpers.—Other operations in the packing house, such as receiving and supplying the fruit and empty crates to the packers, punching packers' tickets, transferring the packed boxes to the nailer, removing cull fruit, and loading the packed crates, are intrusted to floor boys. These boys should be alert, energetic, and strong enough to perform a day's work.

OPERATIONS IN THE PACKING HOUSE

Labeling.—Labeling is most conveniently done before the crates are made. The lithographed labels should be removed from their bundles and spread out in water for at least twelve hours previous to pasting in order that the paste may thoroughly penetrate the paper. Labels that are put on dry curl and drop off when the paste dries. The paste should be made about twelve hours before application so that it will stick well. A convenient device for labeling is a form or slide of such depth and width as to accommodate the end pieces and long enough to contain from thirty to fifty ends (fig. 13). This is constructed as a table raised about three and a half feet from the floor.

The end pieces are placed side by side in this form and the paste is applied with a wide brush to the entire row. The labels are then taken from the water and carefully placed on the ends. The excess paste is washed off with a brush and clean water, and the ends are then stacked until dry.

One person labels and stacks, on the average, about twenty-five hundred ends per ten hours. The cost of labeling averages about twenty-five cents a hundred ends.

Making the crates.—A steel or wooden frame on a nailing bench is used in making the crates (figs. 14, 15). A steel frame is best because it is more durable, does not get out of alignment, and may also be adjusted for making other types of boxes or crates.

The box maker places one labeled end and one plain end in the frame and nails on the bottom pieces. The unions should be made square and accurate and the nails driven flush with the surface of the wood, not sunk. Nails whose points are exposed should be withdrawn. The half-finished crate is taken from the form and placed on a lower shelf, and the side pieces applied. The nailer stacks the completed crates behind him and they are later removed and supplied with baskets.

In making the eight-slat crate, a "spreader" is used to secure uniform spacing of the four bottom pieces (figs. 14, 15).

Receiving and supplying fruit to the packers.—The lug boxes filled with fruit are unloaded from the orchard wagon or truck at the packing house door by the driver and floor boys. The floor boys empty the lugs into the packing bins, using one hand and the forearm to prevent bruising the fruit as they carefully roll it out.

Packing the crate.—As with the packing of all fruits, grading is of first importance. The standardization law defines how the fruit

shall be graded. All fruits which are blemished, infested, or injured in any way should be discarded. Only fruit of uniform quality, size, and maturity should be packed in the same crate. The standardization law also defines the packing of these fruits. A standard pack is three layers deep; no pack shall contain fruits which vary more than one-quarter inch in cross-section, and no layer below the top layer shall contain greater numerical count than the top layer.

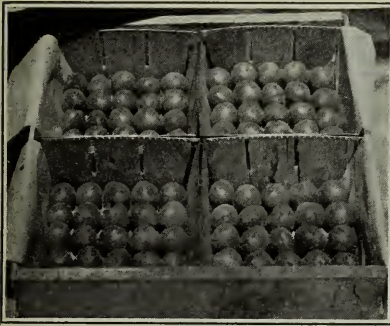
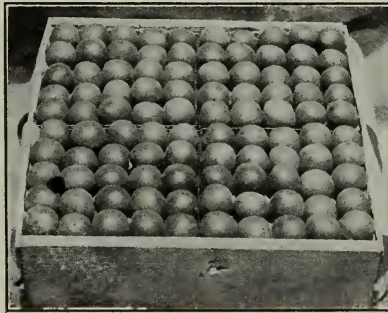
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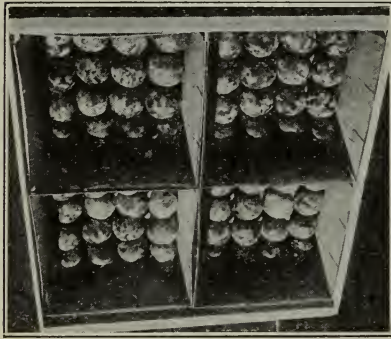
Fig. 16.—Packing apricots. (a) Bottom layer, (b) middle layer, (c) top layer.

The crate containing the four baskets is first placed in position on the packing platform and the paper so placed as to cover one-half of the bottom of each basket, allowing the remaining portion to lap over the sides of the crate.

There are three “styles” of pack, the “straight” or “even” pack (fig. 15*a*), the “offset” pack (fig. 15*b*), and the “diagonal” pack (fig. 15*c*). The kind of pack to use depends upon the size and shape of the fruit. The “straight” pack is employed for those fruits which can be placed cheek to cheek and just fill the width of the basket,

without forcing, and yet close enough so that they will be held firmly in place. If the fruits are of such shape that they will not fit snugly in place by the "straight" method then the "offset" pack should be used. The "diagonal" pack is used for very large fruit, which will not pack by either of the other methods.

Plums and apricots are packed either "solid" throughout the basket or by the so-called "broken pack" method. In the "solid"



a



b



c

Fig. 17.—Packing plums. (a) Bottom layer; (b) middle layer; (c) top layer.

pack the same numerical count occurs in each layer. It is obvious that in the standard apricot and plum basket measuring 8 inches square on top, $6\frac{1}{2}$ inches square on the bottom, and 4 inches deep inside, it is practically impossible to utilize the "solid" pack and keep within the tolerance of $\frac{1}{4}$ of an inch difference in diameter of fruits as between the bottom and top layers. The "broken pack" is therefore recommended as the pack which will permit entire compliance with the requirements of the law so far as size is concerned.

Packing of apricots.—Apricots are packed by arranging the bottom layer with the stem-end up or the fruit on its side depending upon the

size and shape of the variety (fig. 16). Great pains must be used in packing the bottom layer, for the appearance of the top depends upon the foundation. After the first layer is packed the paper is folded over it. It is generally necessary to employ another style of pack for the second layer in order to maintain uniform sizing. Thus, if a "straight" style were used in the first layer, an "offset" should be used in the second. The fruit is placed either on end or on its side, care being used to secure a firm level pack. This arrangement gives a greater number of fruits in the second layer than in the first, but

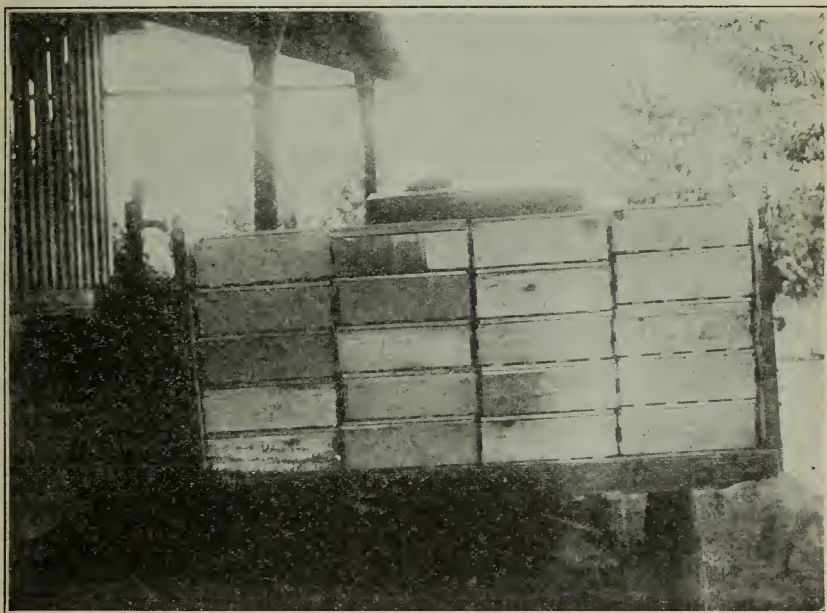


Fig. 18.—Automobile truck loaded with packed crates.

the size remains nearly the same. The paper is next folded over the second layer. The top layer is packed differently, in that the fruits are placed crosswise of the crate, being laid on their sides with the creases down, the stem-ends all pointing in the same direction and being fitted together in such a manner that the apex of each apricot fits into the cavity of the one adjacent to it. The same style of pack is used in the top layer as in the second layer. Having placed the top layer in all baskets the paper is folded over the completed pack.

Packing of plums.—The packing of plums is, with some variations, similar to the packing of apricots (fig. 17). The first layer is placed in the baskets with the fruit either on its side or with the stem up or down, depending upon the size and shape of the variety. With

some kinds (notably the Tragedy) the best pack is obtained when the fruit is given a slight slant. A great deal of experience in plum packing is necessary in order to know these details. The second layer is placed the same way as the bottom one, care being taken again to obtain a solid level pack. The top layer is generally packed with the apex of the plum pointing up. With some varieties, however, as the Wickson, which has a very tender apex, the top layer must be arranged by placing the fruit on its side. The top layer of certain other varieties, such as the Tragedy, is best packed by slanting the fruit.

The "broken" packs listed below* show the number of plums in each layer within the same basket, and an attempt has been made

PLUM PACKS

Variety	Bottom layer	Middle layer	Top layer
Grand Duke	3 × 3	3 × 4	3 × 4
Pond (Gros, Hungarian) and other long, oval plums			
Tragedy	4 × 5	5 × 5	5 × 5
American Blue (German)			
Beauty			
Clyman			
California Blue			
Wickson			
Tragedy	5 × 5	5 × 6	5 × 6
American Blue			
Beauty			
Clyman			
California Blue			
Giant	3 × 4	4 × 4	4 × 5
Pond			
Santa Rosa			
Burbank			
Formosa			
California Red	4 × 4	4 × 5	4 × 5
President			
Kelsey			
Wickson			
Pond	5 × 6	6 × 6	6 × 6
Tragedy			
American Blue			
Beauty			
Clyman			
California Blue			

* Plum packs suggested by F. W. Read, Chief of the Bureau of Standardization, California State Department of Agriculture. June 17, 1921.

to list some of the more common varieties which are adapted to the packs indicated. The list, however, is admittedly incomplete and is given only as a general guide. Certain varieties attain a greater size in some counties than in others and it may be found, therefore, that the packs suggested will not always hold for the varieties listed.

Fruit too large for packing in the crate may be packed in peach boxes, using cleats under the cover if necessary. Small fruit is sometimes shipped in California (Los Angeles) lugs without packing.

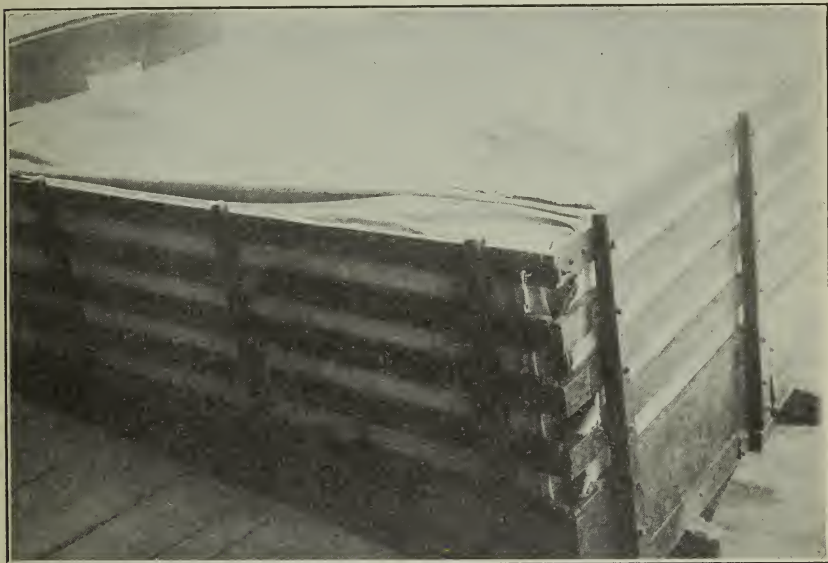


Fig. 19.—A light canvas cover protects the fruit from the sun's heat and the dust from the road.

Fruit from the packers.—When the packer has finished a crate of apricots or plums he labels it in pencil with the variety, style of pack, and his number, and calls for a floor boy who punches a ticket giving the packer credit for the finished crate. The crate is carried by the floor boy, or sometimes by the nailer, to the inspection table.

The inspector, who is also generally the nailer, examines the pack, noting its tightness, uniformity, alignment, general appearance, and suitability for shipment. If a crate is not satisfactory it must be corrected. Accepted crates are placed in the nailing press (figs. 10, 11), the two top pieces and cleats laid in place and the top pressed down. Packed crates should have a bulge of one-half to three-quarters of an inch so that they will ship well. The bulge must not be higher than

the top end cleats, otherwise the crates will “ride.” With extra high packs additional cleats should be used.

Stamping and stacking.—The stamping is done by the nailer. He notes the style of pack as marked by the packer, stamps the crate accordingly. The packed crates are stacked about ten high, with each crate resting directly on the cleats of the one beneath it. For convenience in counting and loading, crates of the same variety and style of pack should be placed in the same pile.

LOADING FOR SHIPMENT

DELIVERY TO THE CARS

The packed crates are delivered to the refrigerator car by wagon or automobile truck (fig. 18). The conveyance should be “easy riding” to prevent bruising of the fruit. The load should be packed snugly so that at all times each crate will rest directly upon the cleats of the one below it, with no possibility of shifting. It is advisable to keep the load covered with a light canvas to avoid excess heating in the sun and to protect from the dust of the roads (fig. 19). If there is a railroad siding at the packing house the packed crates are transferred direct to the car by means of hand transfer trucks.

LOADING THE CARS

Railroad tariff regulations allow 26,000 pounds as a minimum load for a car of fresh fruit from California to eastern points. Apricot and plum crates are estimated at twenty-six pounds gross weight. It would require, therefore, one thousand crates to make the minimum carload weight. The crates are loaded lengthwise of the car in tiers, five crates wide and nine or ten high (fig. 20); there are twenty-one tiers in a car, ten tiers loaded on one side of the doorway and eleven on the other, allowing a space of three feet in the center for bracing (fig. 21), thus:

11 tiers, 5 crates wide, 10 crates high	550 crates
10 tiers, 5 crates wide, 9 crates high	450 crates
—	—
21 tiers	1000 crates

The bracing of the car is very important in order to insure a safe arrival of the fruit. Directions for bracing may be obtained from the **railroad authorities.**

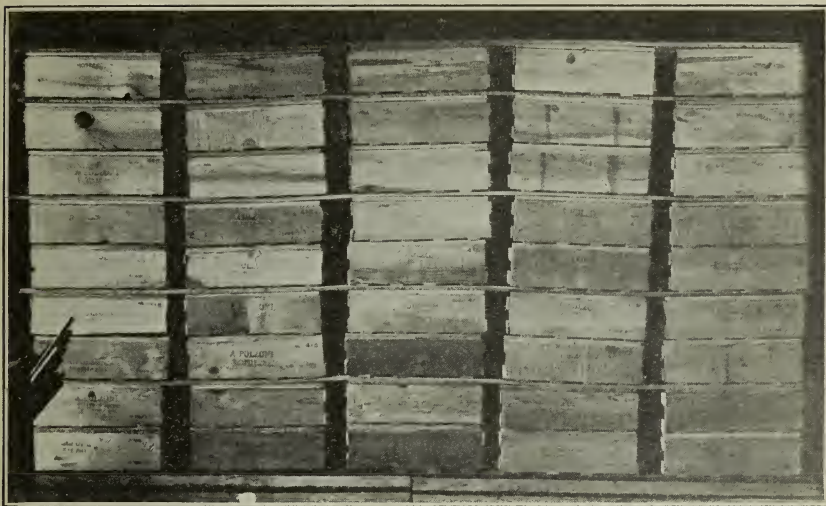


Fig. 20.—Interior of refrigerator car, showing manner of loading and “stripping.”



Fig. 21.—A loaded car with “bracing” in place.

COST OF MATERIALS AND OPERATIONS FOR HANDLING PLUMS

During the season of 1921 the following data were secured from the Silva Bergtholdt orchards at Newcastle:*

Cost of production on trees, per crate	\$.337
Crate and label125
Baskets054
Paper002
Making crates, and nails012
Picking and hauling135
Packing and lidding080
Loading and bracing030
<hr/>	
Total cost	\$.775

* Courtesy of R. E. Hodges, article in Pacific Rural Press, Vol. CII, No. 5, July 30, 1921.